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13. ABSTRACT (Maximum 200 Words)

Prostate cancer kills more Puerto Rican men than cancer of the lung, trachea, and bronchus. Physical activity has an inconsistent relationship with prostate cancer. It is not clear what the relationship between body hapitus and physical activity is among non-Whites population. The underlying hypothesis of the epidemiological research is that excess body adiposity and sedentary lifestyles are independent risk factors for prostate cancer mortality in Puerto Rican men. The specific aims of this proposal are (1) o investigate the association between anthropometric measurements or changes in body weight and prostate cancer mortality, and (2) to study the relationship between physical activity and prostate cancer mortality. This study uses an observational longitudinal design with a random sample of 9,824 Puerto Rican men aged 35-79 years at baseline (1964 who were part of the Puerto Rico Heart Health Program (PRHHP). Using a survival analysis approach and a total follow-up time of approximately 35 years, we plan to examine the relationship of the above risk factors with prostate cancer mortality. There continue to be health disparities in prostate cancer incidence and mortality in minorities and our findings will improve our knowledge of the relationship between prostate cancer and other lifestyles.

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Annual Report
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Title: Prostate Cancer Mortality in Puerto Rican Men: The effect of body habitus and physical activity

INTRODUCTION:

Subject: Prostate cancer kills more Puerto Rican men than the combined cancer mortality rates of the lung, trachea and bronchus. The most extensively studied risk factors for prostate cancer include age, race/ethnicity, family history, diet, androgen metabolism, alcohol consumption, obesity, physical activity and smoking. Of these, age, race and family history are well documented but poorly understood risk factors. The fact that prostate cancer rates change in migrant populations and vary dramatically in ethnically similar populations residing in different geographic locations strongly suggest that environmental factors can greatly influence the risk of this cancer. **Purpose:** The purpose of this investigation is therefore, to study the relationship of physical activity and body habitus with prostate cancer mortality among Puerto Rican men. This study uses an observational longitudinal design with a random sample of 9,824 Puerto Rican men aged 35-79 years at baseline (1964) who were part of the Puerto Rico Heart Health Program (PRHHP). The Puerto Rico Heart Health Program provides a unique epidemiological cohort of men who took part in multiple examinations including extensive information on lifestyle, diet, body composition, exercise, and smoking habits. Survival analyses will be used to study the relationship between prostate cancer mortality and physical inactivity and obesity with approximately 35 years of follow up data. **Scope of the research:** This research is to generate new knowledge of how sedentary lifestyles or excess body weight are related to prostate cancer mortality, and to increase our knowledge of prostate cancer in a population where prostate cancer is the number one killer. Additionally, once prostate cancer mortality is identified, other exposures such as diet, smoking and alcohol intake can also be studied.

BODY:

The research accomplishments will be described based on their accomplishments associated with each task outlined in the "Statement of Work" for the months 12-24. Below is an itemized list of activities that were conducted during year 2 of the research and our progress in completing these tasks. Moreover, we are including a reference list that includes a paper published examining the epidemiology of obesity (1), and we are including literature to further interpret our preliminary findings and implications for future research (2-19).

1. Preparation to corroborate cause of death (months 12-18)

A. Establish a mechanism to corroborate cause of death

After consulting with the Puerto Rico Demographic Registry and the Puerto Rico Cancer Registry, we submitted our request to the Director of the PR Cancer Registry and received a data file with possible matches on prostate cancer mortality in the cohort of men from the Puerto Rico Heart Health Program.

We have implemented a linkage system using data items in common to both sets of data between the Puerto Rico Mortality files and the Puerto Rico Heart Health Program. First, potential matches are identified based on linking the two files by broad sets of matching criteria such as: a) first five characters of last name, and date of birth; and b) "sounds like" (based on phonetic sound) last name, and date of birth. These overlapping methods were developed to compensate for missing or incorrect data (e.g., first or last name misspellings or changes, missing date of birth). Second, each potential match is ranked to determine whether it is "good" (enough data items in common to be considered a match). The ranking criteria are based on the type and number of other data items that match (name, gender, date of birth, marital status, and birthplace), with the criteria more stringent for the broader linkage methods.

An important research finding related to this statement of work is that, although, we did not have social security number on our participants, we were able to find matches based on two-last names (father's last names, and mother's last names). The use of two last-names is a common practice among Hispanics and the Puerto Rico Registries are well prepared to deal with requests that include two-last names matches. This is important to document when conducting mortality research among Hispanics, because for example, one may have more than one person named "Juan Rivera" that were born on the same date, but there was only one "Juan Rivera Zayas" born on the same date. Thus, having two last names showed to be very useful in ascertaining mortality matches.

B. Have data entered into a SAS compatible format

Once exact matches where established, Dr. Dan McGee prepared a dataset into EXCELL that was imported as a SAS data file and combined with the original baseline data. We found 74 prostate cancer cases that were merged with the original dataset using their id number. Once the merge was finalized we corroborated that in addition to matching in id number, that the corresponding birthdates, last names, first name, middle-initials, place of birth and gender in the two files were identical. We placed less value in the marital status of participants since the marital status in the original file and the marital status in the match may be different due to deceased status of the spouse.

2. Interim Data Analyses, (Months 14-24):

A. Analysis of frequencies of prostate cancer mortality

We found 74 cases of prostate cancer. Table 1 below shows a t-test statistics comparing the average age and selected measurements of physical activity and body habitus between the prostate cancer cases and non prostate cancer cases.

Table 1. Comparison of selected physical activity and body habitus measures between prostate cancer cases and non-prostate cancer cases among members of the Puerto Rico Heart Health Program Study Follow Up.

	Prostate cancer cases N=74	Non-prostate cancer cases N=9750	p-value
Age, y Mean, (SE)	55.3 (0.64)	54.41 (0.07)	0.173
Current smoker, %, (SE)	48.65 (5.81)	43.55 (0.50)	0.388
Physical activity measurements			
Percent who engage in no physical activity (12+hrs/day)	4.05 (2.29)	5.28 (0.23)	0.598
Percent who engage in mostly sedentary activities (12+hrs/day) %, (SE)	20.27 (4.67)	22.25 (0.42)	0.677
Percent who engage in moderate physical activity (3+hrs/day), %, (SE)	22.97 (4.89)	19.44 (0.40)	0.476
Percent who engage in vigorous physical activity (3 hrs/day), %, (SE)	13.51 (3.97)	16.48 (0.38)	0.462
Body habitus measurements			
Body mass index wt/h^2, (SE)	25.84 (0.40)	25.15 (0.04)	0.954
Reverse BMI h^2/wt	0.0381 (0.0006)	0.0407 (0.0001)	.0350
Percent who were obese (BMI>=30) %, (SE)	12.16 (3.80)	12.09 (0.33)	0.985
Triceps skinfold measurements mm, (SE)	4.85 (0.23)	4.68 (0.02)	0.463
Arm circumference, mm, (SE)	30.65 (0.34)	29.64 (0.03)	0.004
Knee circumference, mm, (SE)	19.43 (0.17)	19.40 (0.01)	0.046

Table 1 shows that the average age of the participants was not significantly different between men who died from prostate cancer compared to the non-prostate cancer cases. The percent reporting who were current smokers was not significantly

different between the prostate cancer cases and the non-prostate cancer cases.

We stratified the cohort based on their physical activity index pattern during a typical 24 hour period. Four categories of preferred mode of physical activity were selected: (1) No physical activity 12+ hrs/day, (2) sedentary activity 12+ hrs/day, (3) moderate activity 3+hrs/day; and (4) vigorous activity for 3+ hrs/day. Men who engaged in no physical activity for 12 or more hours reflect activities such as sleeping or sitting most of the day. No significant difference between cases and non-cases were observed in this category. The prevalence of engaging in sedentary activities for 12 or more hours a day among prostate cancer cases and non-cases was not significantly different either. These activities include some work conducted while sitting down, such as clerical work. The percent of men who engaged in moderate physical activity for three or more hours was not significantly different between the prostate cancer cases and the non-cases. An example of a moderate activity is walking. Similarly, non-significant differences were observed for participation in vigorous physical activity three or more hours a day. Examples of vigorous physical activity may include, running, and high energy expenditure occupations such as being a sugar cane worker, a construction worker, or other leisure or occupational activity with a metabolic equivalent (MET) greater than or equal to six METs.

Most body habitus measurements were not significantly different between the cases and non-cases; however, we observed that mid-arm circumference was significantly higher among men who died from prostate cancer compared with those who did not. Similar findings were observed for knee circumference.

The following tables are comprehensive comparative analysis of the distribution of the prostate cancer cases compared with the baseline cohort by body habitus measurements and physical activity.

Table 2. Body weight distribution at baseline and distribution of prostate cancer according to body mass index categories.

	Baseline Cohort		***Prostate Cancer Cases***	
BMI Categories	**N**	**%**	**N**	**%**
Underweight (BMI<18.5)	324	3	2	3
Normal weight (BMI=18.5-24.9)	4623	47	32	43
Overweight (BMI=25-29.9)	3689	38	31	42
Obese (BMI>=30)	1188	12	9	12

Table 2 shows that the distribution of prostate cancer cases in the underweight, normal weight, overweight and obese categories were very similar to the distribution in the overall cohort. These are the recommended WHO categories to classify individuals

into different body weight categories based on BMI. The prevalence of obesity (12%) was the same in both the prostate cancer cases and the original cohort. Similar findings were observed for the prevalence of underweight (3%).

Table 3. Quartiles of triceps skinfolds at baseline and distribution of prostate cancer according to quartiles of triceps skinfolds.

	Baseline Cohort		*Prostate Cancer Cases*	
Quartiles of triceps skinfolds	**N**	**%**	**N**	**%**
Quartile 1 (Low) (skinfolds <=3 mm)	3072	31	16	22
Quartile 2 (skinfolds = 4 mm)	2479	25	21	28
Quartile 3 (skinfolds = 5 mm)	1766	18	17	23
Quartile 4 (High) (skinfolds >= 6 mm)	2507	26	20	27

The distribution of prostate cancer cases by quartiles of triceps skinfolds was not drastically different than those observed for the baseline cohort. Because skinfold measurements were taken by mm, it was difficult to ascertain cutoff points that will give exact quartile distributions of 25% at baseline. Skinfold measurements are a good indicator of adipose tissue accumulation, however, they are very difficult to obtain. Our findings do not support a relationship between triceps skinfolds and prostate cancer distribution.

Table 4. Quartiles of knee girth at baseline and distribution of prostate cancer according to knee girth quartiles.

	Baseline Cohort		*Prostate Cancer Cases*	
Quartiles of knee girth	**N**	**%**	**N**	**%**
Quartile 1 (Low) (girth <=18 cm)	2576	26	13	18
Quartile 2 (girth = 19 cm)	2811	29	20	27
Quartile 3 (girth = 20 cm)	2719	28	20	27
Quartile 4 (High) (girth >= 21 cm)	1718	17	21	28

The distribution of prostate cancer cases by quartiles of knee girth showed that the percent of prostate cancer cases (18%) in the low knee girth level (<= 18 cm) was lower than the baseline cohort (26%). We also observed that while only 17% of the baseline cohort had knee girth greater than 21 cm, among the prostate cancer cases 28% were in this high category of knee girth. Greater knee girth may be indicative of higher lower limb adipose tissue accumulation. It may also be indicative of higher muscle mass, although at the knee level this is more likely to be increased adipose tissue, unless measurements are taken immediately above the knee where the vastus lateralis and medialis muscles and the quadriceps muscle insert. Knee girth measurements were taken

at the patellar bone area. Our finding provides some preliminary evidence that higher knee girth is associated with greater cases of prostate cancer.

Table 5. Arm girth quartiles at baseline and distribution of prostate cancer according to arm girth quartiles.

	Baseline Cohort		*Prostate Cancer Cases*	
Quartiles of arm girth	**N**	**%**	**N**	**%**
Quartile 1 (Low) (girth <=27 cm)	2652	27	8	11
Quartile 2 (girth = 28-29 cm)	2179	22	17	23
Quartile 3 (girth = 30-31 cm)	2196	22	23	31
Quartile 4 (High) (girth >= 32 cm)	2797	28	28	35

The distribution of prostate cancer cases by quartiles of arm girth showed that the percent of prostate cancer cases in the low arm girth level (Quartile 1 girth <27 cm) was lower than the baseline cohort. We also observed a trend toward higher number of prostate cancer cases as the arm girth increased. Arm girth may be indicative of peripheral fat distribution, as this measures limb circumference. Arm circumference data, however, is less valid than skinfold measurements in being able to differentiate between adipose tissue and muscle tissue. The results from this table show that as the arm girth increased, the percent of prostate cancer increased in each of the categories.

Table 6. Quartiles of "reversed" body mass index (ht2/wt) at baseline and distribution of prostate cancer according to reversed body mass index quartiles.

	Baseline Cohort		*Prostate Cancer Cases*	
Quartiles of reverse BMI ht2/wt	**N**	**%**	**N**	**%**
Quartile 1 (Low)	2438	25	20	27
Quartile 2	2460	25	20	27
Quartile 3	2455	25	26	35
Quartile 4 (High)	2471	25	8	11

The distribution of prostate cancer cases by quartiles of the reverse of the BMI formula is an interesting measure of body habitus rarely studied. Researchers have argued that BMI is highly correlated with body weight, and with body fat, but to a much lesser extent with height. The inverse of the BMI takes into account another dimension of body habitus (height) as it relates to prostate cancer and it also takes into account body weight. We found lower rates of prostate cancer mortality among men in the higher quartile of reverse BMI when compared to baseline cohort levels. The reverse BMI also allowed for a clear distribution of baseline cohort at 25% in each quartile. These results

show that when taking into account body weight, height may be a very important variable to consider when studying prostate cancer and anthropometric measurements.

The relationship between body fat and stature-adjusted weight indices was explored by Nevill and Hordell (2). The investigators suggested that the term height square is a valid indicator of a subject's lean body mass, and that height^2/weight was shown to be amore accurate measure of percentage lean body mass than body mass index (BMI; weight/height^2). Thus, it is suggested that this indicator is a better predictor of body composition than the traditional BMI. We are using the term reverse BMI, while other investigators suggest the name, lean body mass index (LBMI) for the index of height^2/weight. These assumptions were confirmed empirically using the results from the Allied Dunbar National Fitness Survey (ADNFS). Using simple allometric modelling, the term height squared explained 74% of the variance in lean body mass compared with less than 40% in body weight. Thus, our findings suggest a higher lean body mass index is associated with lower prostate cancer mortality.

Table 7. Distribution of participants engaging in total (leisure and occupational) physical activity by quartiles based on 24 hour physical activity index and distribution of prostate cancer cases by quartiles of total (leisure and occupational) physical activity.

	Baseline Cohort		***Prostate Cancer Cases***	
Quartiles of Physical Activity	**N**	**%**	**N**	**%**
Quartile 1 (Low)	2687	27	18	24
Quartile 2	2427	25	20	27
Quartile 3	2291	23	20	27
Quartile 4 (High)	2419	25	16	22

The percent of prostate cancer cases according to quartiles of physical activity was not very different when compared with the baseline cohort. Thus, our preliminary findings do not support the hypothesis that participation in high levels of physical activity reduces the risk of prostate cancer mortality. Conversely, participation in little or no physical activity does not seem to increase the risk of fatal prostate cancer either.

KEY RESEARCH ACCOMPLISHMENTS:

1. Prostate cancer mortality among participants from the Puerto Rico Heart Health Study was updated as of 2001. We found a total of 74 prostate cancer cases. The expected number of cases is comparable to the number of prostate cancer cases found in the Health Professional Follow up Study (8). In this study they found 339 metastatic or fatal prostate cancer cases in a cohort of 46,786 men. Using the proportion equation that 339 is to 46,786 what X is to 9,824, we should have found 71.2 cases, we found 74 cases.

The age-adjusted mortality from prostate cancer in the US and in PR are very similar 15.7/100,000 and 16.1/100,000 respectively.

2. We found no evidence of an association of BMI and prostate cancer. This lack of an association between BMI and other anthropometric measurements has been confirmed by other studies (4-9).

3. We found no significant difference between physical activity patterns - as measured by being completely inactive, mostly sedentary, participation in moderate physical activity or vigorous physical activity - and prostate cancer mortality. These findings have also been recently confirmed in other studies (3, 5, 7, 8).

4. We found a relationship between arm girth and knee girth and prostate cancer mortality, where higher prostate cancer cases had higher arm and knee girth. Also, the distribution of prostate cancer cases was higher among those in the higher quartile of knee and arm girth. Most studies have not found an association between most anthropometric measurements and prostate cancer risk, thus, the incorporation of other body habitus sites may yield new knowledge in the relationship of prostate cancer and body habitus (4-9).

5. The reverse BMI (h^2/wt) or lean body mass index was found to be significantly higher among prostate cancer cases compared with non-prostate cancer cases. This body habitus measurement is a better predictor of lean body mass than the traditional body mass index.

REPORTABLE OUTCOMES:

1. Manuscripts: We published a review of the literature about the public health implications of obesity in the Journal of Physicians and Sports Medicine (1).
2. Funding applied for based on work supported by this award: We received funding from NIH to further continue the work initiated in this grant. The two grants are described below.

    a. **Diet and Cancer in Puerto Rican Men**. We successfully competed for funding to study the effect of diet and prostate cancer to the NIH/NCI Grant number 1RO3 CA-103475-01. More specifically, this grant intends to examine the relationship of consumption of legumes and prostate cancer in PR men. Our work with the Army grant was instrumental in showing the reviewers that we could work with the staff from the Puerto Rico Cancer Registry and the Puerto Rico Demographic Registry. Below is the abstract of the funded grant.

This grant intends to study prospectively diet and prostate cancer among Puerto Rican men who took part in the Puerto Rico Heart Health Program (PRHHP). Few studies have been able to study the relationship of diet with prostate cancer mortality longitudinally among Hispanics or any other minority group in the United States. Although cancer mortality rates have decreased in the past 20 years in the general population, it has increased in the Hispanic population. Cancer mortality rates among Hispanics are lower than those observed among non-

Hispanic whites; however, for Puerto Ricans both in the United States and in Puerto Rico, cancer mortality rates are greater than those observed for all Hispanics combined. Moreover, the number one cancer killer among Puerto Rican men is prostate cancer, not lung cancer. The reason for this inter- and intra-ethnic variation in cancer rates remains unclear. Established and emerging risk factors associated with prostate cancer include age, race, diet, obesity, physical inactivity, smoking, alcohol intake and sexually transmitted diseases, among others. The PRHHP collected information on these risk factors during four examinations between 1964 and 1980 with enormous potential for increasing our understanding of the etiology of this disease in US minority populations.

Most of the published information on legumes and prostate cancer are based on findings from soy legumes with limited applicability to the US diet, since non-soy legumes are the most commonly eaten type of legumes in the Western diet. We found only one published epidemiological study that examined the relationship of non-soy legumes with prostate cancer. Consumption per capita of legumes in Puerto Rico is double that of the US. The specific aim of this small grant is to examine the relationship of dietary consumption of non-soy legumes with prostate cancer mortality in Puerto Rican men.

For this grant we plan to ascertain and characterize prostate cancer mortality in the cohort of men from the PRHHP using information from the Puerto Rico Demographic Registry, Puerto Rico Cancer Registry and the National Death Index Plus. This proposal is innovative because (a) it takes advantage of an established cohort to investigate cancer mortality in an under-studied Hispanic subgroup with higher cancer mortality rates than other Hispanic subgroups; (b) has the potential to study other exposures such as skin color, sexually transmitted disease, alcohol, smoking and other emerging risk factors with prostate and other cancers; and (c) will contribute new knowledge regarding the relationship between intake of non-soy legumes and prostate cancer mortality.

b. **The University of Puerto Rico and Roswell Park Cancer Institute Partnership.** This is a planning grant to the NIH/NCI (1 P20 CA96256-01A1) promoting cancer research among minority populations and will provide funding and resources for established investigators from a comprehensive cancer center (Roswell Park Cancer Institute) to collaborate with minority investigators from a Minority Serving Institution (University of Puerto Rico). The work on the Army grant was instrumental in showing that we had the expertise to conduct research in the Puerto Rican population. Below is the abstract.

This application for a P20 planning grant is submitted by the University of Puerto Rico – Río Piedras campus, a minority serving institution and the Roswell Park Cancer Institute, a NCI Comprehensive Cancer Center. The general goal is to develop a collaborative association between the two institutions to increase the number of minority scientists engaged in cancer research. The specific aims of this planning grant are: 1) To develop joint research projects in the areas of cancer epidemiology, prevention, and control in areas of diet, exercise, tobacco and

the environment and 2) To support the development of a multidisciplinary team-oriented program to train pre-doctoral and post-doctoral candidates to pursue careers in basic and applied cancer research. We intend to expand the current cancer research training and career development opportunities by increasing the interaction between minority scientists and established investigators through seminar, workshops, retreats and formation of inter-institutional research teams. Two pilot projects are described in this partnership. They will examine the role of diet on breast cancer in Puerto Rican women, and the relationship of dietary fat with prostate cancer in a cohort of Puerto Rican men with 35 years of follow up. Additionally, we propose to fund one or two meritorious pilot research projects through the formation of research teams. These inter-institutional research teams will prepare a small research proposal to be reviewed by a panel of outside advisors with NIH study section review experience. We envision that this type of interaction and partnership will enhance the cultural competency skills of all scientists involved in this grant. The activities planned are designed to represent true collaborations that function seamlessly across the institutional boundaries of both institutions. Under this partnership the University of Puerto Rico will gain access to and collaboration with established investigators in cancer epidemiology, and will increase the cancer research training opportunities for students and junior faculty. The Roswell Park Cancer Institute will then gain cultural competency in conducting cancer research with Hispanics that will further expand current recruitment efforts of Hispanic participants into clinical trials and population-based research, increase the admission of Hispanic students into the current training programs, and promote the development of minority scientists.

CONCLUSION:

In summary the important findings from this progress report are that we were able to update prostate cancer mortality in the cohort. Participation in physical activity was not related to prostate cancer mortality, however, some body habitus measurements such as arm girth, knee girth, and reverse BMI (h^2/wt) were significantly different between the prostate cancer cases and the non-prostate cancer cases (2). The implication of this finding is that h^2/wt is a better predictor of lean body mass than the commonly used form of BMI. Thus, future studies should include this body habitus measurement to better understand its relationship with prostate cancer.

The implication of the ongoing research activities being funded through this grant from the US Army Medical Research and Material Command is the ability to prospectively study the effect of physical activity, selected measurements of body habitus and prostate cancer mortality in a large group of Hispanics. Most of the information presented in the scientific literature is based on findings from mostly European-whites and very little is available from longitudinal studies. Our findings confirm a lack of an association between physical activity and prostate cancer observed elsewhere (3-5). Although the most commonly reported measurements of body habitus (BMI, overweight categories, and skinfold) in our study failed to have an effect on prostate cancer, other measurements such as arm girth, knee girth, and reverse BMI were significantly different between the prostate cancer cases and the non-prostate cancer cases.

Again, we believe this to be a very important finding in lieu of the lack of an association between anthropometric measurements and prostate cancer reported in other studies (6-9).

Overall, the investigation currently funded by this grant has allowed the investigator to successfully compete for external funding at NIH to continue the study of diet and lifestyle on prostate cancer in this understudied minority population.

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APPENDICES:

1. Response to reviewer comments

2. Reprint of article entitled "Obesity in the United States: A worrisome epidemic". The Physician and Sports Medicine. 2003; 31(11):23-28.

3. Chapter Prevalence of overweight and obesity in the United States published in the book "Obesity: etiology, assessment, treatment and prevention," edited by Ross Andersen.

4. CV-Biosketch

Appendix A

Response to Reviewers' Comments

Project title: Prostate Cancer Mortality in Puerto Rican Men: The Effect of Body Habitus and Physcial Activity

Award Number: DAMD 17-02-1-0252

Principal Investigator: Carlos J. Crespo, DrPH,MS, FACSM

RESPONSE TO REVIEWERS' COMMENTS

1. **FORMAT/EDITORIAL ISSUES**
   a. **Reviewers' Comments**:

The body of this report does not provide data or findings. The body should describe the research accomplishments associated with each task outlined in the approved Statement of Work. Data presentation shall be comprehensive in providing research findings for the period of the report.

Response:

We agree with this statement and have completely modified the progress report to comply with format and editorial issues, and with content issues. Above you will find the revised annual report. In the body of the text we have now outlined each item in the statement of work for year 2 with a detailed description and explanation of the findings describing in detail the research accomplishments associated with each task. Item 1 deals with preparation to corroborate cause of death (months 12-18) and there are two subcategories (A) Establish a mechanism to corroborate cause of death and (B) Have data entered into a SAS compatible format. Item 2 is a description of preliminary data analysis. We are producing seven tables providing a comprehensive list of research findings for the period of the report. After each table we provide a comprehensive discussion of the analysis and results presented in each table.

   b. **Reviewers' Comments**:

Key Research Accomplishment: The key research accomplishment section of this report did not provide discussion or analysis of the results. This section should be a bulleted list of accomplishments emanating from this research, whereas the conclusion should summarize the result to include the importance and/or implications of the completed research.

Response:

We now provide a bulleted list of accomplishments emanating from this research. We found five key important findings from the research and compared these findings with what has been observed in the scientific literature recently (2-19). Briefly, the expected number of cases is in target with other prospective studies in population with similar prostate cancer rates. The most common indicators of body habitus were not related to prostate cancer mortality; however, knee, arm and reverse BMI were significantly different between prostate cancer cases and non cases. These findings have implications to researchers who are using typical measurements of body habitus and not using other very good indicators of adipose tissue.

   c. **Reviewers' Comments**:

Manuscripts in preparation can be included in the annual report but are not

credited as reported outcomes until they are published or accepted for publication. Additionally, the abstract physical activity and breast cancer has not been credited as a reported outcome since it does not appear to be supported by this grant.

Response:

We have deleted the physical activity and breast cancer abstract as a reportable outcome. We now only include papers that have been published or accepted for publications.

2. CONTRACTUAL ISSUES

a. **Reviewers' Comments**:

In appendix E the PI has included manuscript entitled "Self Reported Diabetes as a Toll in Epidemiological Studies: Some Empirical Based observations Based on the Puerto Rico Heart Health Study Program" and "Wide pulse pressure as a risk factor for cardiovascular mortality among Puerto Rican men" do not address the goal of this grant. The PI should provide justification for these two studies relative to prostate cancer in the revised report.

Response:

We apologize for not providing sufficient justification of why diabetes and pulse pressure were relevant to the goals of this grant: prostate cancer. Using data from the Puerto Rico Heart Health Program, we have examined two additional parameters that may be linked to prostate cancer: diabetes and pulse pressure. Pulse pressure is a marker of arterial stiffness. There is a new body of literature linking these two conditions with prostate cancer. The reason for our initial examination of these two factors in this cohort was to later examine the relationship between diabetes and prostate cancer mortality, and pulse pressure and prostate cancer mortality (see references 10-19). Some studies have found no association between diabetes while others have found that they are related. Diabetes is the third leading cause of death in Puerto Rico, and we thought pertinent to eventually study whether diabetes is related with prostate cancer. The diabetes paper was our first step to get acquainted with the diabetes data in the Puerto Rico Heart Health Program. The Wide Pulse Pressure manuscript may be of scientific value given its relationship to prostate cancer mortality. It is not clear if prostate cancer mortality is higher among men who have higher or lower arterial stiffness. We have provided several references to that end to more clearly justify the inclusion of these two manuscripts. The Wide Pulse Pressure paper has been accepted for publication in the Journal of Nutrition, Metabolism and Cardiovascular Disease.

Appendix B

Copy of article entitled "Obesity in the United States: A worrisome epidemic". *The Physician and Sports Medicine. 2003; 31(11):23-28.*

Project title: Prostate Cancer Mortality in Puerto Rican Men: The Effect of Body Habitus and Physcial Activity

Award Number: DAMD 17-02-1-0252

Principal Investigator: Carlos J. Crespo, DrPH,MS, FACSM

Obesity in the United States

A Worrisome Epidemic

Carlos J. Crespo, DrPH, MS

Joshua Arbesman

For CME, see
www.physsportsmed.com/cme.htm
beginning in December 2003

IN BRIEF: In the past decades, obesity has reached epidemic proportions in the United States, even among children, adolescents, and young adults. The prevalence of obesity is higher among non-Hispanic black (36%) and Mexican American women (33%) than among non-Hispanic white women (22%). Various explanations for increased obesity have been proposed, including decreases in exercise and occupational and recreational physical activity and an increase in sedentary lifestyles. Television watching is directly related to obesity and energy intake among children age 8 to 16 years and may be a target for intervention. Physicians can use these data to help counsel patients about weight management, especially in reducing inactivity and overeating.

Illustration: Mary Schill

The prevalence of obesity continues to increase in the United States for both children and adults. Multiple cultural, environmental, genetic, and behavioral factors have been identified as possible causative agents. Obesity is of great public health concern, because it is directly related to diabetes, hypertension, osteoarthritis, and other chronic conditions. Moreover, obesity, as well as other conditions for which it serves as a major risk factor, is highly prevalent in all groups of the population.[1-4] The number of adults who are classified as extremely obese (body mass index [BMI] > 40 kg/m^2) tallies in the millions.[5-7] Physicians must know the scope and root causes of the problem so they can appropriately intervene.

For author disclosure of financial relationships and mention of unlabeled use of drugs, see the next page.

Epidemiology of Obesity

The National Institutes of Health's National Obesity Education Initiative has proposed a classification for disease risk relative to normal weight and waist cir-

continued

TABLE 1. National Institutes of Health Obesity Education Initiative Classification of Categories of Obesity

Category	BMI (kg/m^2)	Obesity Class	Disease Risk Relative to Normal Weight and Waist Circumference	
Underweight	<18.5	-	Men: ≤102 cm (≤40 in.) Women: ≤88 cm (≤35 in.)	Men: >102 cm (>40 in.) Women: >88 cm (>35 in.)
Normal	18.5 to 24.9	-		
Overweight	25 to 29.9	-	Increased	High
Obesity	30 to 34.9	1	High	Very high
	35 to 39.9	2	Very high	Very high
Extreme obesity	≥40	3	Extremely high	Extremely high

BMI = Body mass index

cumference (table 1).[8] These standards have been supported by the World Health Organization. In adults, preobesity or overweight is defined as a BMI between 25 and 29.9 kg/m^2, and obesity is defined as BMI greater than or equal to 30. The obese classification for adults was based on various studies, reference population criteria, and more recently, data relating morbidity and mortality to weight.[8,9]

The terminology used in childhood obesity research is not standardized in the literature. Classifications of the different categories—at risk of overweight, overweight, or obese—among children are based on a statistical definition from the 2000 Centers for Disease Control and Prevention (CDC) growth charts for the United States. Therefore, because outcome-based criteria for children are lacking, a statistical approach has been proposed as the most practical choice.[10-13] Some researchers use the term "at risk for overweight" to refer to children between the 85th and 95th percentile and overweight to children in the 95th percentile,[14,15] while others prefer to use the terms overweight for children at or exceeding the 85th percentile and obese for children who exceed the 95th percentile to more closely match the terminology used for adults.[16-19]

Regardless of the classification system, overweight children often become overweight adults and are therefore more likely to experience a higher morbidity associated with excess body weight.[20] Although BMI is not a perfect measure in children because it covaries with height, it has been validated against measurements of body density.[18] Obese children (95th percentile) do tend to become overweight adults, and therefore obesity may have a better positive predictive value than overweight (85th percentile).[10,21] For this paper, overweight is defined as the 85th percentile and obesity as the 95th percentiles, based on sex- and age-specific groups of children.[16,19]

The Problem Among Children

The most recent data from the National Health and Nutrition Examination Survey (NHANES) show that the prevalence of overweight and obesity in children, adolescents, and young adults ages 2 to 19 years old has increased dramatically since the 1960s. The prevalence of overweight in these age-groups ranges from 20.6% among children 2 to 5 years old to 30.4% among adolescents 12 to 19. Moreover, recent findings from 1999-2000 NHANES show that the problem continues to

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Disclosure information: Dr Crespo and Mr Arbesman disclose no significant relationship with any manufacturer of any commercial product mentioned in this article. No drug is mentioned in this article for an unlabeled use. The work was supported by a grant from US Army Medical Research DAMD 170210252.

worsen in all the age-groups (figure 1).[15] Another critical problem is that obesity disproportionately affects minority populations.

Upward trends. Between NHANES II (1976-1980) and NHANES III (1988-1994), obesity increased in children 4 to 5 years old but not in younger children.[22] On the other hand, among Mexican American children 1 to 2 years old, the prevalence of obesity is double that of non-Hispanic white children of the same age. Non-Hispanic black girls also exhibited a higher prevalence of obesity than non-Hispanic white girls younger than 2 years old.[22] It is therefore not surprising to observe a greater prevalence of obesity among minority adolescents and adults. In fact, the prevalence of obesity is highest among Mexican American boys and African-American girls; it is double the prevalence observed among age- and sex-matched non-Hispanic white children.

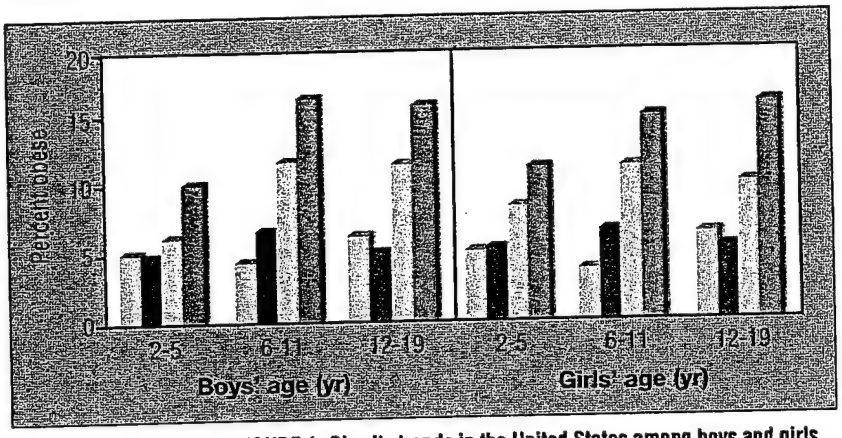

FIGURE 1. Obesity trends in the United States among boys and girls ages 2 to 19 years.

Adapted from Ogden et al.[15]

Predisposing factors. It is unclear what specific or combination of cultural, lifestyle, genetic, or environmental factors account for differences.[11,23-25] Public health officials have tried to identify modifiable risk factors to implement policies that will decrease obesity in minority populations.[26-28]

The recent Healthy People 2010 report[28] identified television viewing as an important public health target to reduce the percentage of children who watch 2 or more hours a day. We have found that television watching is positively related to adiposity[29] and that obesity also increases with more television viewing.[16,30] Almost 40% of African-American boys and girls watch 4 or more hours of television, while 15% of non-Hispanic whites watch similar amounts. Concomitant increases in obesity and energy intake in relation to hours of television watching have been documented (figure 2).[16,30] The lowest prevalence of obesity is seen among children who watch 2 hours or less of television. Although television watching is not entirely a surrogate measure for physical inactivity, it does provide a good estimate of the number of hours that children spend being inactive and correlates very well with energy intake.[16,29,31]

continued

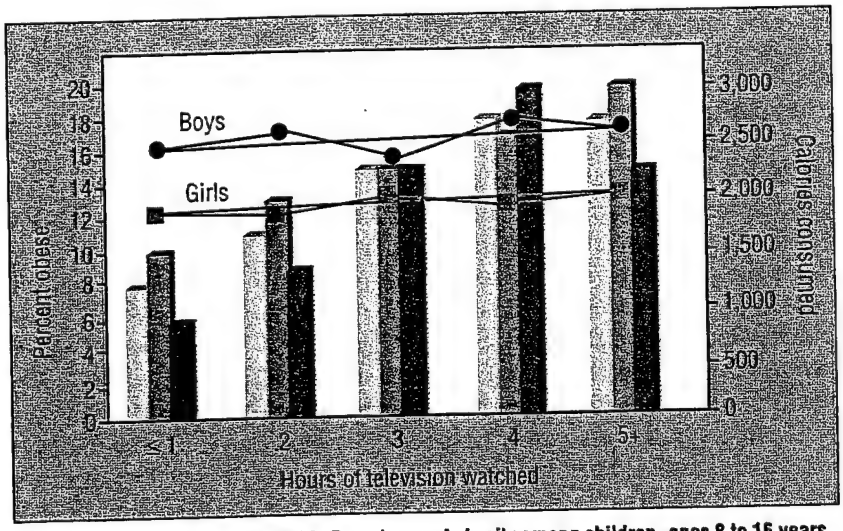

FIGURE 2. Prevalence of obesity among children, ages 8 to 16 years old who watch television. Linear trends of energy intake are included for each category of hours of television watched.

Adapted from Crespo et al[16] and the Third National Health and Nutrition Examination Survey, 1988-1994.

Gregg and Narayan[32] studied 2,205 black and white girls who were between the ages of 9 and 10 years old and reported racial variation in the relationship between self-esteem and adiposity, with the magnitude of the effect somewhat less in black girls. Whether these racial differences extend to college students needs to be studied further. Jeffery[24] suggested that obesity in US minority groups is best understood as a variation on a larger cultural theme: the creation of an environment in which highly palatable foods are accessible to all at low cost, and physical activity is not required.[24]

Obesity's Perception Among College Students

Female college students are more likely to think of themselves as being overweight than their male counterparts. However, the percentage of college males and females who were overweight, based on BMI, was not drastically different.[33] A larger percentage of college students who had a BMI less than 25 kg/m^2 considered themselves as overweight; this was not so for black male college students. These results revealed that not only gender differences but cultural differences may play a role in who considers themselves as overweight.[28,34,35]

To better understand the nation's physical suitability for joining the armed forces, Nolte et al[36] examined the percentage of persons between 17 and 20 years old who would not be eligible for military services because of excess body weight. On average, 15% to 20% of those in this age-group would not qualify for service, based on current military guidelines. Moreover, among women, almost 45% would not qualify for the US Army, while 35% would not qualify for the Marine Corps.[36] Height and weight acceptance criteria of the armed forces are not necessarily based on BMI (see table 1), and thus, more research is needed to better determine how they establish who qualifies and what criteria they use for their cutoff points.

The Consequences of Obesity in US Adults

From 1960 to 1980, the prevalence of obesity among adults in the United States was relatively stable; however, recent findings from NHANES showed that 3 of 10 US adults are obese (figure 3).[8,37] In addition to increasing mortality from all causes, obesity is closely linked to hypertension, type 2 diabetes mellitus, dyslipidemia, gallbladder disease, osteoarthritis, coronary heart disease, stroke, and sleep apnea and other respiratory problems. Also, increasing evidence suggests that it is a risk factor for endometrial, breast, prostate, and colon cancer.[2,7,38,39]

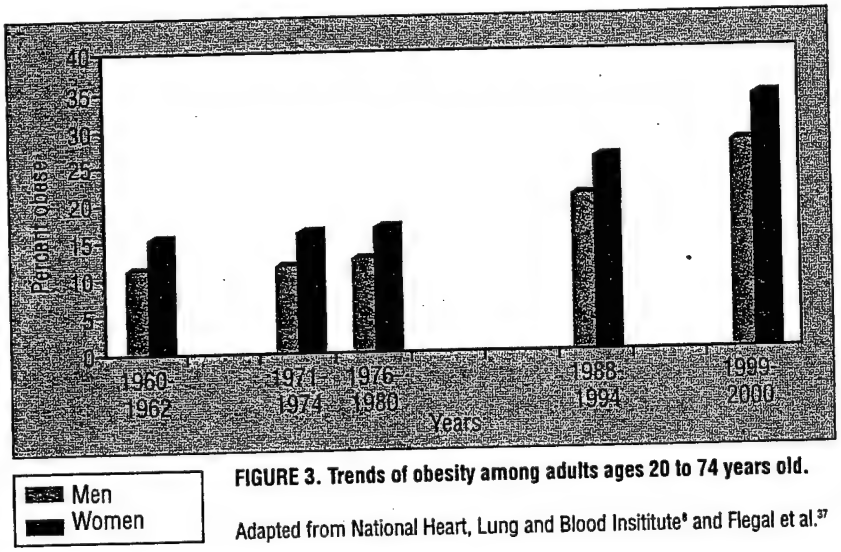

FIGURE 3. Trends of obesity among adults ages 20 to 74 years old.

Adapted from National Heart, Lung and Blood Insititute[8] and Flegal et al.[37]

Obesity disproportionately affects more women and minorities than non-Hispanic white men.[37,40,41] The prevalence of obesity in non-Hispanic black (36%) and Mexican American women (33%) is greater than among non-Hispanic white women (22%). Unfortunately, data have not been collected systematically to address this issue across different ethnic groups in the United States.

Data from NHANES III and NHANES 1999-2000 show that overweight was more common among men (59.1%, 95th confidence interval [CI], 57.4-61.4) than among women (50.3%, 95th CI, 48.6-52.8), yet more women (24.5%, 95th CI, 22.7-26.6) were obese than men (19.4%, 95th CI, 18.1-20.9). These results indicate that more men have a BMI greater than or equal to 25 kg/m^2, but more women have a BMI greater than or equal to 30 kg/m^2.

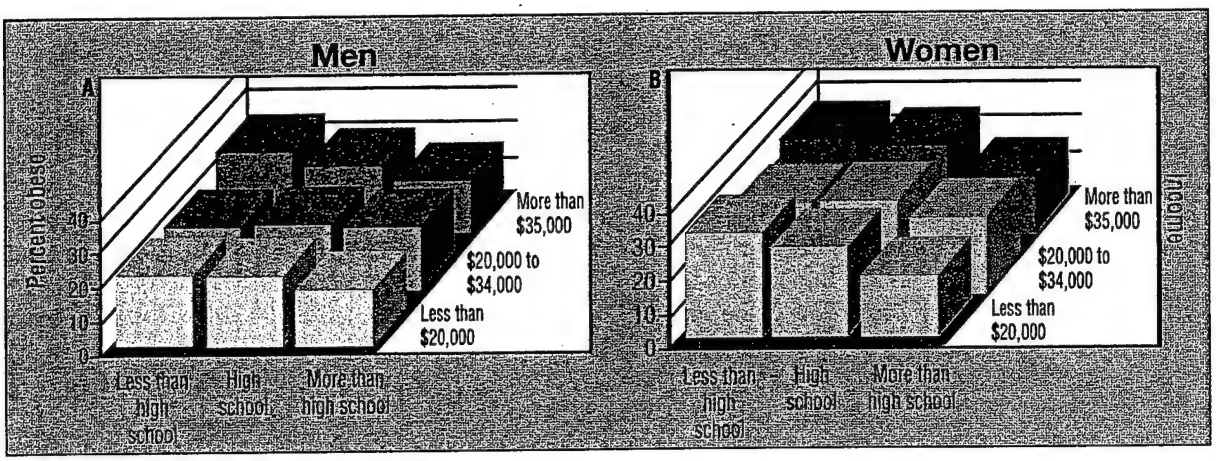

FIGURE 4. Prevalence of obesity among US adult men (A) and women (B) according to socioeconomic status.

Data from the Third National Health and Nutrition Examination Survey, 1988-1994.[47,48]

Obesity is lowest among adults between ages 20 to 29 and among those 80 and older (< 20%). Several explanations may account for the differences in the age distribution of obesity. First, it may be possible that the prevalence observed among those 20 to 29 will not change in subsequent years, thus producing a "cohort effect." Similarly, the cohort of men 60 to 69 years old with the highest prevalence of obesity (> 35%) may reveal that, 20 years from now, obesity is highest among those 80 and older. In fact, between 1988 and 1994, the highest prevalence of obesity was among those 50 to 59 years old, and now the highest is among those 60 to 69 years old. The highest percent increase in the prevalence of obesity between 1988 to 1994 and 1999 to 2000 was observed among those 60 to 69 years old for both men and women (13% increase).

An explanation for the lower prevalence of obesity among persons 80 and older might be that those who were obese died before age 80 and were not available for the study, producing a "survivor effect." Thus, those persons with healthier body weight tended to live longer, and obese individuals were less likely to survive past age 60.[37] These estimates of overweight parallel the excess burden of other chronic diseases such as type 2 diabetes, heart disease, hypertension, breast cancer, and other disorders that occur during this period in life.[42-45]

Obesity, Education, and Social Class

Some researchers have suggested that the prevalence of obesity is related to social class.[11,23,46] Extreme obesity (BMI ≥ 40 kg/m^2) is most prevalent among African-American women (15.1%), while the prevalence of extreme obesity in the rest of the other racial and ethnic groups was less than 5.5%.

Other important indicators of social class are education and income, and these factors seem to influence obesity differently. Education is typically related to behaviors (eg, diet, exercise, smoking), whereas income is related to things purchased (eg, health insurance, prescription medication).[47] To better understand how education and income are related to obesity, the prevalence of obesity was tallied in different strata of social classes using nine mutually exclusive categories of education and income (figure 4).[47,48] Among women, the highest prevalence of obesity was among those who had less than a high school education and earned less than $20,000 a year. Among men, the prevalence of obesity was highest among those in the highest income category but who had less than high school education. Invariably, obesity is lowest among those who have more than a high school education, regardless of income.

Poverty and lower educational attainment are consistently associated with obesity, independent of ethnicity, and therefore affect more persons in minority populations than in white populations.[48] Thus, minorities may be at higher risk for obesity because of their increased poverty rate and lower educational attainment. Our understanding of how and why obesity develops should involve the integration of social, behavioral, environmental, cultural, physiologic, metabolic, and genetic factors.

Excess Calories, Physical Activity, and Obesity

Lack of physical activity and excess calorie consumption are some of the reasons epidemiologists sug-

continued

gest obesity has increased in the last 20 years.[16,29,30,49,50] A panel of experts met at the 1999 American College of Sports Medicine to try to understand the role of exercise in preventing and treating obesity.[51] The evidence reviewed suggested that exercise is beneficial in preventing weight gain and is also an important adjunct modality in treating obesity. Barely 24% of the general population, however, engages in physical activity for 30 minutes a day, 5 or more days a week as is recommended by the US surgeon general. It is unclear if overweight persons accurately report their exercise habits, and if those who report exercising do so at the recommended frequency, intensity, and duration.

About two thirds (67% of men and 62% of women) of overweight adults reported that they use physical activity to lose weight, but only about one fifth (22% of men and 20% of women) met the recommended guidelines of being physically active for 30 minutes most days of the week. Thus, overweight adults are just as inactive as the general population. Decreases in physical activity combined with excess energy intake are almost certainly responsible for the increase in overweight and obesity at the population level.[51,52] However, participation in physical activity, either occupational or recreational, was not tracked systematically until 1985, when the National Health Interview Survey obtained baseline data for the Healthy People 1990 report. In that survey, roughly 24% of the population reported participating in no leisure-time physical activity. These estimates have been confirmed in other national surveys,[53] and the estimates have not changed dramatically since.[27,28,54]

Proactive Clinician Choices

The prevalence of overweight and obesity at the population level highlights the fact that obesity is rife in all segments of the population, especially among minorities, women, and children. Among US children, television watching correlates with obesity, and increased calorie intake has been observed among those children who watched the most. Because obesity is so prevalent, physicians will undoubtedly encounter patients who are overweight or obese and children who are at risk of overweight. These encounters provide an opportunity to assess lifestyle practices, such as daily participation in leisure-time, occupation, and transportation physical activities. They also can help target interventions, for example, suggesting that children watch less television, or at least do something during commercials.[55] Also important are culturally sensitive approaches to healthy eating.

Paramount for the clinician is that overweight and obesity are precursors to other serious chronic conditions and are an emerging risk factor for other life-threatening diseases. These disorders tend to disproportionately affect minority populations, which underscores the need to improve the cultural competence of today's clinician.

The Fat and the Lean

Obesity is highly prevalent and rising in the United States. Contributing factors likely include reduction in all types of physical activities and increases in calorie intake and smoking cessation.[56] The data presented here reveal the accelerating pace of obesity between 1960 and 2000, a stark contrast from the stable rates observed between 1960 and 1980. These dramatic increases were observed in both adults and children. Future research needs to address the interaction between genetic, social, cultural, and environmental factors. **PSM**

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A complete reference list will be available at www.physsportsmed.com beginning in December.

Appendix C

Copy of chapter "Prevalence of overweight and obesity in the United States" published in the book "Obesity, etiology, assessment, treatment and prevention"

Project title: Prostate Cancer Mortality in Puerto Rican Men: The Effect of Body Habitus and Physcial Activity

Award Number: DAMD 17-02-1-0252

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Chapter 1

Prevalence of Overweight and Obesity in the United States

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Obesity is unquestionably a condition of public health significance in the United States. Pre-obesity (BMI 25-29.9) and obesity (BMI ≥30), as well as other conditions for which these serve as a major risk factor, are highly prevalent in all groups of the population (Allison and Saunders 2000; Pi-Sunyer 1999). It is therefore of interest to know which groups are affected, and to what extent this condition is disproportionately represented in certain segments of the U.S. population. In this chapter, we will examine how obesity occurs in various groups. For adults the prevalence of overweight (BMI ≥25) is consistently high, regardless of how the data were obtained (e.g., home interviews, telephone interviews, physical examination surveys, or surveillance systems). What the different data systems confirm is that U.S. adults are becoming more and more obese as time goes on. In fact, the number of adults who are morbidly obese (BMI ≥39) ranks in the millions (Blair and Nichaman 2002; Flegal et al. 1998; Kuczmarski 1993; Schoenborn, Adams, and Barnes 2002).

Prevalence of Obesity Among Adults

An estimated 97 million adults in the United States are overweight or obese, and with obesity comes a host of other preventable chronic diseases and conditions (Pi-Sunyer 1999). In addition to increasing mortality from all causes, obesity is closely linked to hypertension, type 2 diabetes mellitus, dyslipidemia, gallbladder disease, osteoarthritis, coronary heart disease, stroke, sleep apnea, and other respiratory problems. Other studies have found that obesity is a risk factor for endometrial, breast, prostate, and colon cancer, making this condition a substantial contributor to premature mortality (Bianchini, Kaaks, and Vainio 2002; Terry, Miller, and Rohan 2002).

Earlier data from the National Health Examination Survey (NHES) and the National Health and Nutrition Examination Survey (NHANES) used the 85th percentile of BMI for persons 20 to 29 years of age as a cutoff point to estimate the prevalence of overweight (Kuczmarski et al. 1994). Using these previous

cutoff points, men with BMI ≥27.8 or women with BMI ≥27.3 were considered overweight. More recently, the World Health Organization and the U.S. National Institutes of Health (NIH) modified the excess body weight cutoff points to distinguish between overweight and obesity. The evidence-based report titled "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults" recommended that overweight be defined as a BMI between 25 and 29.9, and that obesity be defined as a BMI greater than or equal to 30 (Pi-Sunyer 2000). Table 1.1 shows the NIH's National Obesity Education Initiative proposed classification and the disease risk relative to normal weight and waist circumference.

This chapter includes some data that predate the recent WHO and NIH BMI cutoffs. Therefore, we will use the terms *excess body weight* to refer to the cutoff points for men with BMI ≥27.8 or women with BMI ≥27.3, *pre-obesity* to refer to cutoffs of BMI between 25 and 29.9, *overweight* for BMI ≥25, and *obesity* for BMI ≥30. Overweight and obesity are not necessarily mutually exclusive conditions since obese persons are also overweight (Arroyo et al. 2000; Flegal et al. 1998; Kuczmarski 1993; Pi-Sunyer 2000). More information on the value of BMI in the characterization of obesity will be discussed in later chapters.

The prevalence of obesity is a major public health concern throughout the United States (see figure 1.1 for the percent distribution of the

Table 1.1 *National Obesity Education Initiative Classification Table*

	BMI (kg/m²)	Obesity class	Disease risk relative to normal weight and waist circumference	
			Men ≤102 cm (≤40 in.) Women ≤88 cm (≤35 in.)	>102 cm (>40 in.) >88 cm (>35 in.)
Underweight	<18.5			
Normal	18.5-24.9			
Overweight	25-29.9		Increased	High
Obese	30-34.9	I	High	Very high
	35-39.9	II	Very high	Very high
Extremely obese	≥40	III	Extremely high	Extremely high

Reprinted from Obesity Education Initiative Clinical Guidelines.

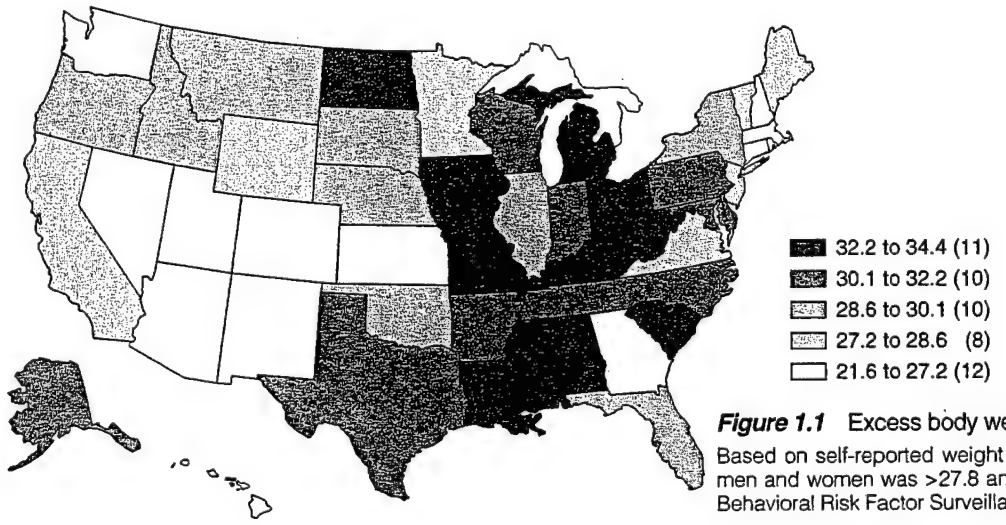

Figure 1.1 Excess body weight in the United States. Based on self-reported weight and height. Overweight for men and women was >27.8 and >27.3, respectively. From Behavioral Risk Factor Surveillance System, 1996.

prevalence of adults with excess body weight), with higher prevalence mostly occurring in the middle to eastern part of the United States with the exception of Georgia and the New England states (Bolen et al. 2000). Data from the Third National Health and Nutrition Examination Survey (NHANES III), conducted between 1988 and 1994, revealed that overweight is a pervasive condition among non-Hispanic whites and blacks, and among Mexican Americans (Flegal 1999). Unfortunately, data on other minority groups have not been collected systematically (Kuczmarski et al. 1994).

Surveys prior to NHANES III had an age limit of 74. During NHANES III, persons two months of age and older were eligible to participate in the study. Data from NHANES is unique, in that sampled persons went through a battery of anthropometric measurements including weight and height measurements. Table 1.2 shows the

Table 1.2 *Body Weight Distribution Among U.S. Adults*

	Sample size	Healthy weight (BMI = 18.5-24.9)	Overweight (BMI ≥25)	Obese (BMI ≥30)
		%	%	%
All	17,030	42.8	54.8	22.1
Men	7,953	39.6	59.1	19.4
Non-Hispanic white	3,271	39.2	59.5	19.5
Non-Hispanic black	2,094	40.8	56.8	20.7
Mexican American	2,233	32.2	66.6	22.4
Women	9,077	45.8	50.3	24.5
Non-Hispanic white	3,813	49.6	46.6	22.2
Non-Hispanic black	2,577	30.3	66.4	36.4
Mexican American	2,253	31.2	66.4	33.2
Education				
<12 years	7,016	38.9	58.0	25.8
12 years	5,106	40.1	57.8	24.4
13-15 years	2,696	44.9	52.3	20.7
16 or more years	2,087	50.6	46.5	14.5
Income				
<$10,000	2,638	40.8	55.1	27.0
$10,000-$19,999	4,347	39.5	57.8	25.9
$20,000-$34,999	3,695	41.1	56.1	22.4
$35,000-$49,999	2,109	44.9	53.2	20.4
$50,000+	3,792	46.2	51.2	19.0
Poverty				
Below poverty	3,617	37.9	58.7	27.6
1-1.85 above poverty	3,756	40.5	56.4	25.8
1.85+ above poverty	9,657	44.2	53.2	20.4

age-adjusted prevalence (per 100) of persons of normal weight (BMI 18.5-24.9), overweight (BMI ≥25), and obese (BMI ≥30) in U.S. adults 20 years and older. Overweight was higher among men (59.1%, 95th confidence interval (CI): 57.4-61.4) than among women (50.3%, 95th CI: 48.6-52.8), yet more women (24.5%, 95th CI: 22.7-26.6) were obese than men (19.4%, 95th CI: 18.1-20.9). These results indicate that more men have a BMI greater than or equal to 25, but more women have a BMI greater than or equal to 30.

The prevalence of overweight (BMI ≥25) is highest among Mexican American men, as shown in figure 1.2, and it peaks between the ages of 50 and 59. The prevalence is lowest among persons between the ages of 20 and 29 and among those 70 and older. There may be several explanations for the differences in the age distribution of overweight. First, the prevalence observed among those 20 to 29 years may not change in subsequent years, thus producing a "cohort effect." Similarly, the cohort of men with the highest prevalence of overweight, those 50 to 59 years old, may still be the most overweight cohort 30 years from now, when they are 80 years old and older. Another explanation for the lower prevalence of overweight among persons 70 and older may be that those who were overweight died before age 70 and were not available to be randomly selected for the study, producing a "survivor effect." Thus, those persons with healthier body weight tend to live longer, and obese individuals are less likely to survive past age 60.

As shown in figure 1.3, the prevalence of overweight among minority women is greater than among non-Hispanic white women before age 70. As observed in Mexican American men, Mexican American women consistently

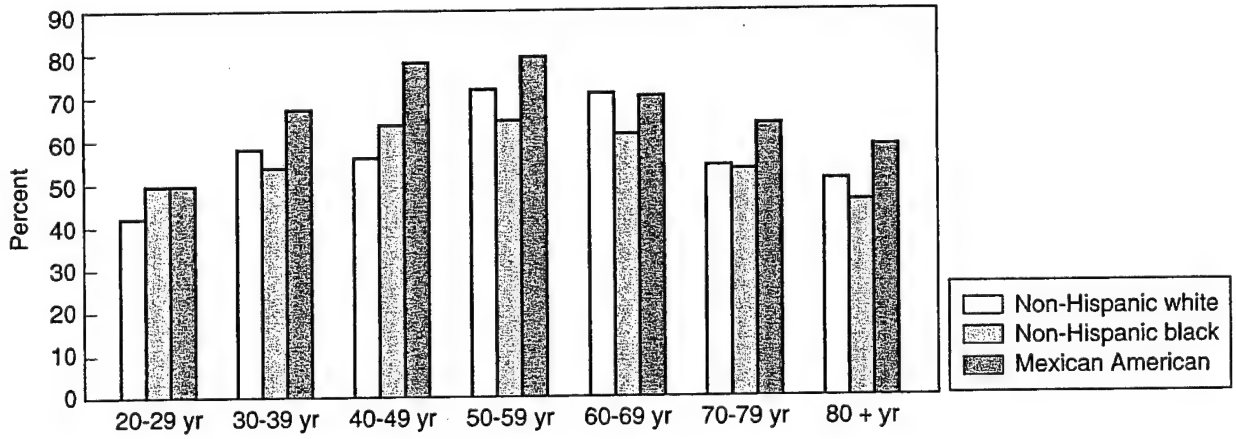

Figure 1.2 Prevalence of overweight in U.S. men.
From NHANES III, 1988-1994.

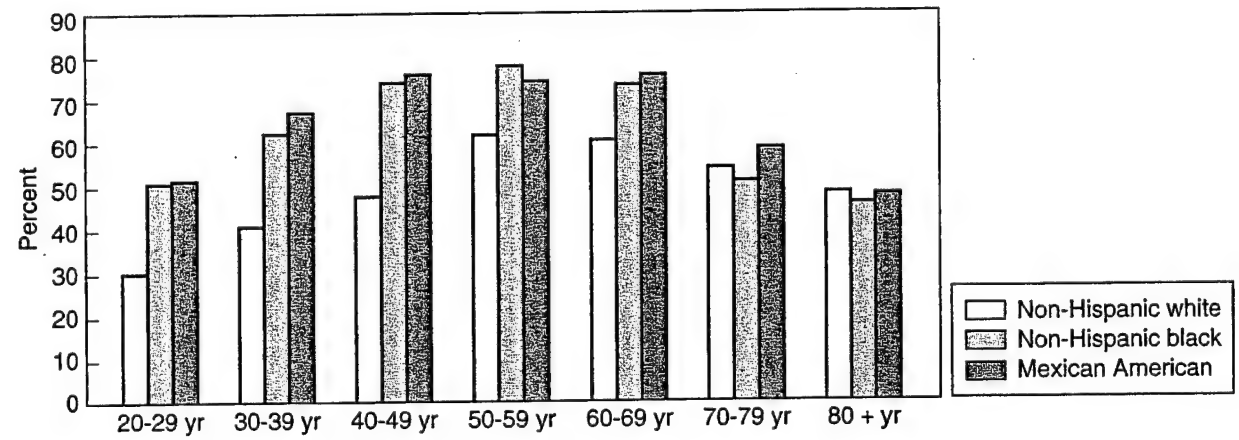

Figure 1.3 Prevalence of overweight in U.S. women.
From NHANES III, 1988-1994.

have a higher prevalence of overweight than any other group of non-Hispanic whites and across all age groups. Non-Hispanic black women also experience a higher prevalence of overweight and obesity between ages 20 and 69, whereas in the older age groups the prevalence is similar to non-Hispanic whites. As with men, overweight peaks for non-Hispanic black women at ages 50 to 59 and for Mexican American women at ages 60 to 69. These estimates of overweight are concomitant with the excess burden of other chronic diseases such as type 2 diabetes, heart disease, hypertension, breast cancer, and other conditions that occur during this period of life for both men and women (Kopelman 2000; Martorell et al. 2000; Ostir et al. 2000). To what extent overweight and obesity are causative or predisposing factors will be discussed later in this book.

Overweight (BMI ≥25), which also includes obese persons (BMI ≥30), peaks during the ages of 40 to 69, as illustrated in figures 1.2 and 1.3. To distinguish between overweight and obesity, we show the prevalence of obesity (BMI ≥30) in figures 1.4 and 1.5. Among men (see figure 1.4), the prevalence of obesity was lowest among those 80 years and older. This may again be due to a survivor effect. Non-Hispanic black men between the ages of 20 and 29 had a higher prevalence of obesity than their non-Hispanic white and Mexican American counterparts in the same age group. Between the ages of 40 and 59, Mexican American men had the highest prevalence of obesity, yet the lowest prevalence of obesity was observed among Mexican American men age 80 or older.

Obesity was more prevalent among non-Hispanic black and Mexican American women

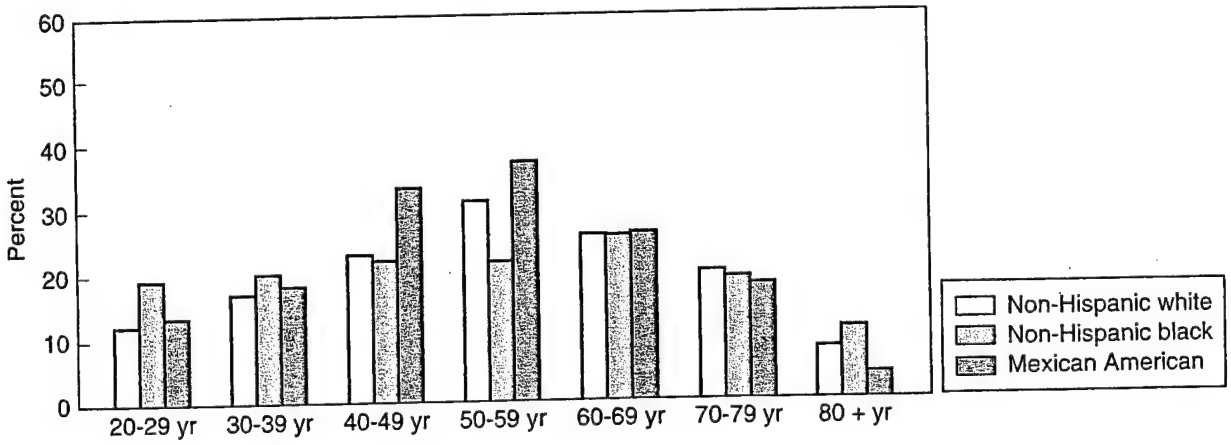

Figure 1.4 Prevalence of obesity in U.S. men.
From NHANES III, 1988-1994.

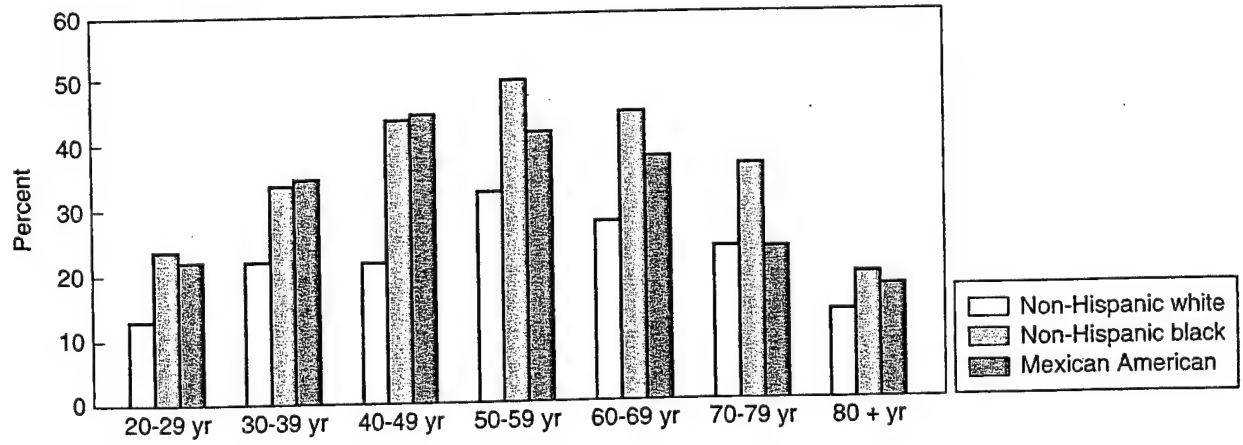

Figure 1.5 Prevalence of obesity in U.S. women.
From NHANES III, 1988-1994.

than among non-Hispanic white women in every age group. Among women ages 70 to 79, black women had the highest prevalence of obesity when compared to their non-Hispanic white and Mexican American counterparts in the same age group. Almost half of all black women between the ages of 50 and 59 were obese, and consistently over 40% of all black women between the ages of 40 and 69 were obese (see figure 1.5).

Prevalence of Obesity Among College Students

More female college students think of themselves as being overweight than do their male counterparts; however, the percent of college males and females who were overweight, according to their BMI, was not drastically different. It is interesting to note that only among male black college students was the percent of persons with excess body weight greater than the percent that thought that they were overweight. In every other group, more persons considered themselves overweight than actually were. These results revealed that not only may gender differences play a role in who considers themselves overweight, but cultural differences may also play an important role (Bolen et al. 2000; Debate, Topping, and Sargent 2001; Kumanyika 1993).

Gregg and Narayan (1998) studied 2,205 black and white girls aged 9 and 10 and reported racial variation in the relationship between self-esteem and adiposity, with the magnitude of the effect somewhat less in black girls. Whether this racial difference extends to college students needs to be further studied (Gregg and Narayan 1998). Several investigators (Faith et al. 2001; Epstein 1996; Epstein et al. 2000; Jeffery 1991) have suggested that obesity in minority groups in the United States is best understood as a variation on a larger cultural theme—the creation of an environment in which highly palatable foods are accessible to all at low cost and physical activity is not required. A cultural acceptance toward higher body weight among blacks and Hispanics may also explain why minorities may be at higher risk for overweight, but this remains to be studied further (Gregg and Narayan 1998).

Prevalence of Obesity Among Children

Adults have been classified as obese based on a variety of studies, reference population criteria, and more recently, data relating morbidity as well as mortality to weight status (Pi-Sunyer 1999). In the absence of outcome-based criteria for children, a statistical approach is the most practical choice for classification (Bellizzi and Dietz 1999; Cole et al. 2000; Guillaume 1999; Malina and Katzmarzyk 1999). Overweight or obesity will therefore be defined relative to a selected sex- and age-specific percentile of a reference population. In this chapter, we will define overweight and obesity as the 85th and 95th percentiles, respectively, based on sex- and age-specific groups of children examined during two national representative health examination surveys: NHES II (1963-1965) and NHES III (1966-1970) (Troiano and Flegal 1999). A recent workshop on childhood obesity concluded that although body mass index is not a perfect measure in children because it covaries with height, it has been validated against measurements of body density (Dietz and Bellizzi 1999). Obese children (95th percentile) do tend to become overweight adults and therefore may have a better positive predictive value than overweight children (85th percentile) (Guo and Chumlea 1999; Malina and Katzmarzyk 1999).

Overweight and obesity in children ages 8 to 16 has increased dramatically in the United States. Data from NHANES III conducted from 1988 to 1994 showed that approximately 25% of children ages 8 to 16 were overweight, and 12% were obese. Preliminary data from the NHANES of 1999 showed continued increments in obesity prevalence among both boys and girls (National Center for Health Statistics 2002). Overweight and obesity were not drastically different between boys and girls, although more girls tried to lose weight than did boys (Bolen et al. 2000; Bowen, Tomoyasu, and Cauce 1991).

Both Mexican American boys and girls, and non-Hispanic black girls, aged 8 to 16 have some of the highest prevalence of obesity in the United States, ranging from 15.5 to 17.1% (see table 1.3). It is unclear what cultural, lifestyle, genetic, or environmental factors may explain these differences (Bowen et al. 1991;

Table 1.3 *Overweight and Obesity in U.S. Children*

	N	Overweight		Obese	
		Prevalence (SE)	95% CI	Prevalence (SE)	95% CI
Total	4,113	27.2 (1.3)	24.4, 30.0	12.4 (0.9)	10.5, 14.4
Boys	2,021	29.0 (1.6)	25.8, 32.3	13.8 (1.5)	10.7, 16.8
8-10 years	809	31.4 (2.5)	26.3, 36.4	17.3 (2.7)	11.9, 22.8
11-13 years	660	28.3 (2.3)	23.6, 33.0	11.9 (2.0)	8.0, 15.9
14-16 years	552	27.4 (3.8)	19.8, 35.0	12.0 (2.8)	6.4, 17.5
Girls	2,092	25.3 (1.7)	21.7, 28.8	11.1 (1.1)	8.8, 13.4
8-10 years	759	24.5 (2.5)	19.5, 29.4	11.8 (1.7)	8.3, 15.3
11-13 years	711	25.8(2.9)	19.9, 31.6	11.4 (1.8)	7.8, 15.0
14-16 years	622	25.7 (3.0)	19.6, 31.7	10.0 (1.7)	6.6, 13.5
Race/ethnicity:					
Non-Hispanic whites	1,071	26.4 (1.9)	22.7, 30.2	11.9 (1.3)	9.3, 14.5
Boys	513	29.1 (2.2)	24.7, 33.5	12.8 (1.9)	9.0, 16.6
Girls	558	23.6 (2.3)	18.9, 28.2	10.9 (1.5)	7.8, 13.9
Non-Hispanic blacks	1,450	29.3 (1.2)	27.0, 31.6	15.5 (1.1)	12.9, 17.2
Boys	722	28.9 (1.7)	22.6, 29.2	14.4 (1.3)	11.8, 17.0
Girls	728	32.8 (1.9)	29.0, 36.5	15.7 (1.6)	12.5, 19.0
Mexican Americans	1,406	33.7 (2.6)	28.4, 38.9	16.3 (2.0)	12.2, 20.4
Boys	695	35.1 (2.3)	30.5, 39.7	17.1 (2.1)	12.9, 21.4
Girls	711	32.2 (3.6)	24.9, 39.5	15.5 (2.9)	9.6, 21.4

Prevalence (per 100) of U.S. children aged 8 to 16 who were overweight (using age- and gender-specific 85th percentile of BMI from NHES 1963-1970) and obese (using age- and gender-specific 95th percentile of BMI from NHES 1963-1970) by age and race and ethnicity, 1988-1994. SE=standard error; CI=confidence interval

Cole et al. 2000; Jeffery 1991; Roberts 2000). Public health officials have tried to identify modifiable risk factors to implement policies that will have an impact on obesity prevalence in minority populations.

We have found that television watching is positively related to adiposity (Andersen et al. 1998) and that obesity also increases with more television viewing (Crespo et al. 2001; Gortmaker et al. 1996). *Healthy People 2010* has also identified television viewing as an important public health target to reduce the percent of children who watch television for two or more hours a day (U.S. Department of Health and Human Services 2000). Figure 1.6 shows the prevalence of obesity increasing with the number of hours watched. The lowest prevalence was observed among those who watch one hour of television or less per day. Although television watching is not the only

cause of physical inactivity, it does serve as a good estimate of the number of hours that children spend being inactive (Andersen et al. 1998).

Ogden and colleagues (1997), in their examination of the prevalence of obesity in preschool children, observed notable increases among children 4 and 5 years of age between NHANES II (1976-1980) and NHANES III (1988-1994), but not in younger children. The prevalence of obesity was twice as high for Mexican American boys and girls than it was for non-Hispanic white boys and girls ages 1 and 2. Non-Hispanic black girls also exhibited a higher prevalence of obesity than did non-Hispanic white girls younger than 2 years of age (Dennison, Erb, and Jenkins 2002; Ogden et al. 1997). It is therefore not surprising to observe a greater prevalence of obesity among minority adolescents and adults.

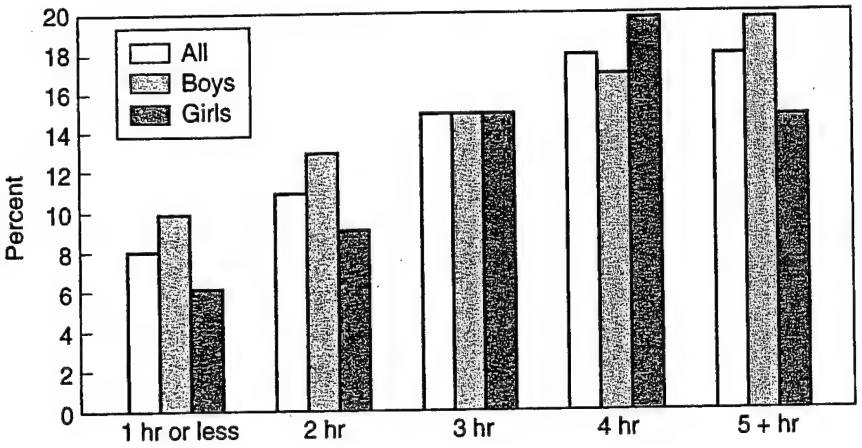

Figure 1.6 Prevalence of obesity by hours of television watching in children 8 to 16 years of age.
Reprinted, by permission, from C.J. Crespo et al. 2001, "Television watching, energy intake, and obesity in U.S. children," *Archives of Pediatric Adolescence Medicine* 155: 360-365.

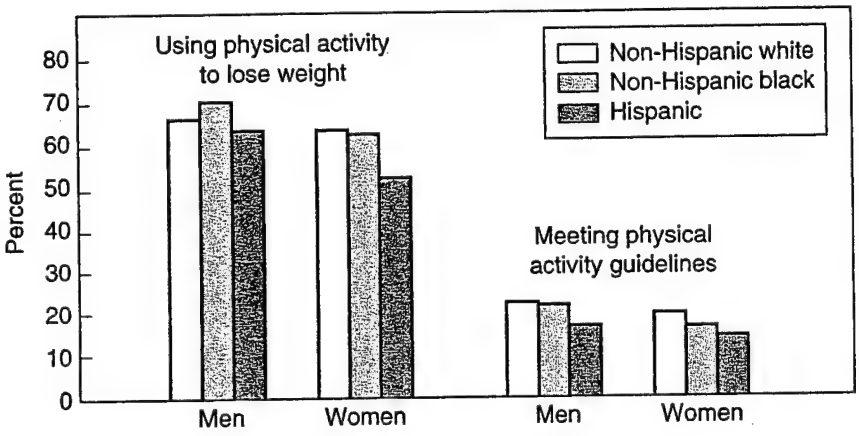

Figure 1.7 Physical activity among overweight adults.
From MMWR, April 21 2000 Vol 47, 326-330.

Prevalence of Obesity and Physical Activity

Lack of physical activity and excess caloric consumption are some of the reasons epidemiologists suggest for the increase of obesity in the last 20 years (Allred 1995; Andersen et al. 1998; Crespo et al. 2001; Gortmaker et al. 1999; Roberts, Lucas, and Hirsch 2000). A panel of experts met at the 1999 American College of Sports Medicine to more clearly understand the role of exercise in the prevention and treatment of obesity (Blair and Brodney 1999). The evidence reviewed suggested that exercise is beneficial in the prevention of weight gain and is also an important adjunct therapeutic modality in the treatment of obesity. In the general population, however, barely 24% of the population engages in physical activity for 30 minutes a day, five or more days a week as recommended by the U.S. surgeon general. It is unclear whether overweight persons accurately report their exercise habits, and whether those who report exercising do so at the recommended frequency, intensity, and duration.

Figure 1.7 presents the percent of overweight adults who reported using physical activity as a way to lose weight. Although two out of three (67% for men and 62% for women) of the overweight adults reported using physical activity as a strategy to lose weight, only one out of five (22% of men and 20% of women) met the recommended physical activity guidelines of being physically active for 30 minutes most days of the week. Given that between 22 and 25% of the general population report meeting the recom-

mended amount of moderate-intensity physical activity (30 minutes a day, most days of the week), the findings from this study show that overweight adults are no more active than the general population. The authors reported that, for both sexes, using physical activity to lose weight was inversely related to age and BMI and directly related to education levels. Additionally, the prevalence of using physical activity to lose weight was highest among black men and lowest among Hispanics of both sexes. The southern states had the lowest percent of people who reported using physical activity as a strategy to lose weight (Gordon et al. 2000).

Prevalence of Obesity and Social Class

Some researchers have suggested that the prevalence of obesity is related to social class (Cole et al. 2000; Gortmaker et al. 1993; Messina and Barnes 1991; Stern et al. 1995). Three social class indicators (education, income, and poverty) were used to describe the prevalence of normal weight, overweight, and obesity. Table 1.2 on page 5 shows that overweight and obesity were highest in the least educated and in those living in households earning less than $10,000 a year. Poverty Index Ratio is calculated by the federal government and combines the number of persons in the household and household income, and also takes into account some regional differences. Those living 185% above the poverty line had the lowest prevalence of overweight and obesity.

In an attempt to better understand how education and income are related to obesity, figures 1.8 and 1.9 show the prevalence of obesity by different strata of social class using nine mutually exclusive categories of education and income. In men (see figure 1.8), the highest prevalence of obesity was observed among those with less than a high school education, but living in a household with earnings of $35,000 or more a year. Among those earning less than $20,000 a year, the prevalence of obesity was highest among those who completed 12 years of school (high school). The prevalence of obesity among those with more than 12 years of education (more than high school) was highest among those earning between $20,000 and $35,000.

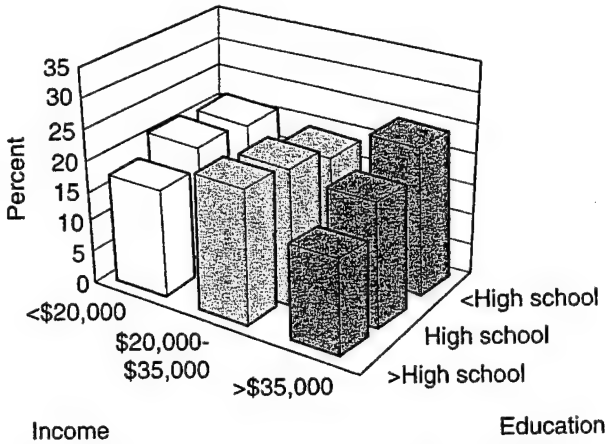

Figure 1.8 Social class and its relation to obesity in men 20 years and older.
From NHANES III, 1988-1994.

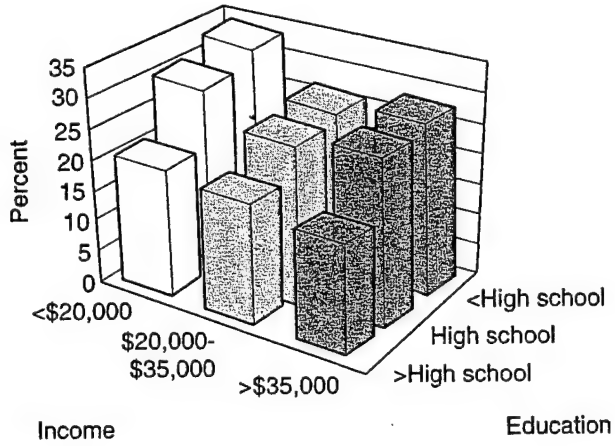

Figure 1.9 Social class and its relation to obesity in women 20 years and older.
From NHANES III, 1988-1994.

Among women, the prevalence of obesity was consistently highest among those with less than 12 years of education (less than high school), and lowest among those with more than 12 years of education (greater than high school) in every income category (see figure 1.9). These results are different from those observed in men, where the most educated men did not always have the lowest prevalence of obesity. In both men and women, the most educated and those with the highest income had the lowest prevalence of obesity.

Gender, poverty, and race are three major risk factors of weight-related problems that are often ignored in the literature on weight management (Bowen et al. 1991; Crawford et al. 2001; Livingstone 2000). Kumanyika and Golden (1991) established that poverty and

lower educational attainment are associated with obesity, independent of ethnicity, and therefore affect a relatively higher percent of persons in minority populations than in white populations. Thus, minorities may be at higher risk for obesity because of their increased poverty rate and lower educational attainment.

Our understanding of how and why obesity develops requires the integration of social, behavioral, cultural, physiological, metabolic, and genetic factors. Obesity affects millions of U.S. adults and children, representing one of the most challenging public health problems. Labor-saving devices, overconsumption of calories, and the percent of persons who engage in little or no leisure time physical activity may partially explain the current prevalence of obesity.

Trends in Prevalence

Since 1960 the National Center for Health Statistics has been tracking weight and height data on adults as well as children. Some of these data produced the growth charts used by every pediatrician to track the weight and height of children in the United States and throughout the world. More recently, these charts were updated using data from a national representative sample of children two months and older from NHANES III, and other pertinent data from infant birth records (Kuczmarski et al. 2002). Data collected on adults has yielded fairly accurate information to track the percent of adults who are overweight and obese. Contrary to other health indicators, the accuracy of calculating body mass index does not change significantly over time. Weight and height are among the most valid and reliable biological measurements commonly available.

More than 60% of white men and black women were overweight between 1988 and 1994. Although overweight (BMI ≥25) estimates were highest in white men, the prevalence of obesity (BMI ≥30) was higher among white women than men (see figures 1.10 and 1.11). The prevalence of obesity was highest among black women. Alarming increases in the prevalence of obesity have been observed in children as illustrated in figure 1.12. The prevalence of obesity in 1999 revealed an alarming increase in the percent of obese persons when compared to previous reference points on data collected between 1960 and 1980 (Schoenborn et al. 2002). Ruling out measurement error, other changes must have

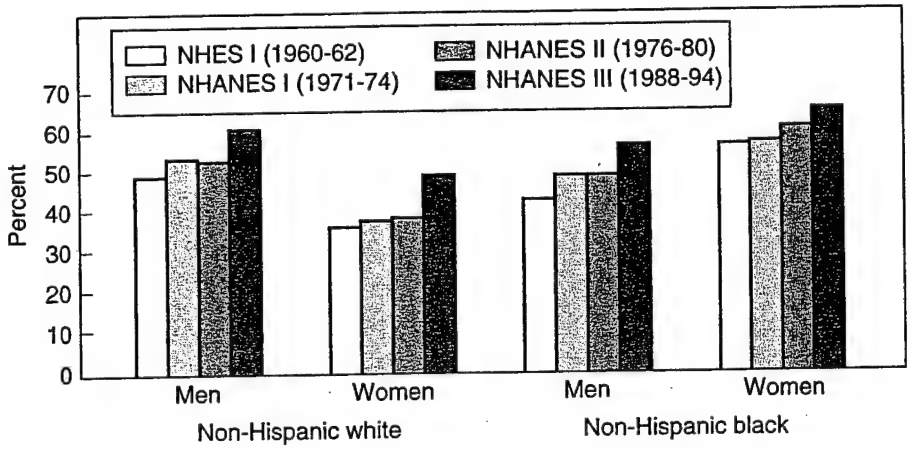

Figure 1.10 Trends in age-adjusted prevalence of overweight in white and black adults, age 20 to 74.

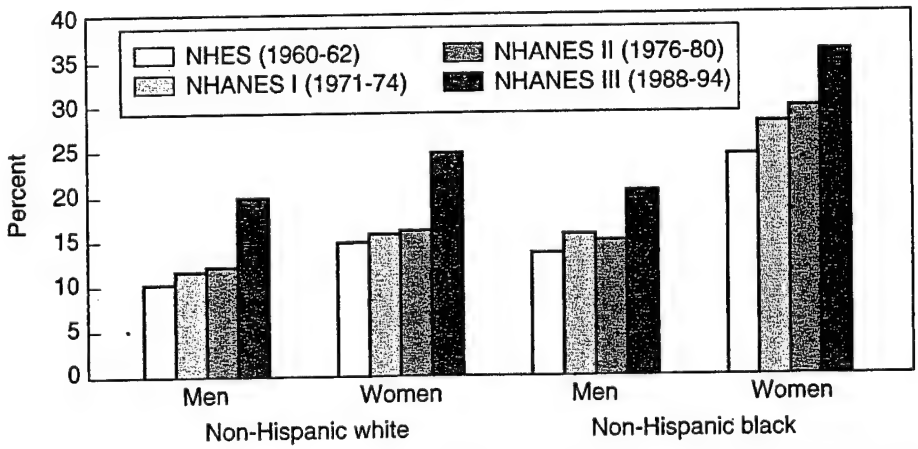

Figure 1.11 Trends in age-adjusted prevalence of obesity in white and black adults, age 20 to 74.

occurred during the 1980s to account for the observed increases in obesity. It is unlikely that the genetic pool could have been responsible for this increase in such a short period of time. (A discussion of the genetic influence on obesity can be found in chapter 4.)

Some have suggested that the increase in overweight and obesity may in part be due to the increase in smoking cessation, although it probably does not explain most of the increase (Flegal et al. 1995). Others have suggested that the recent trend in overemphasizing low-fat foods and underemphasizing total caloric intake may have contributed to increased consumption and thus increased caloric intake (Cummings, Parham, and Strain 2002; Lee et al. 2001).

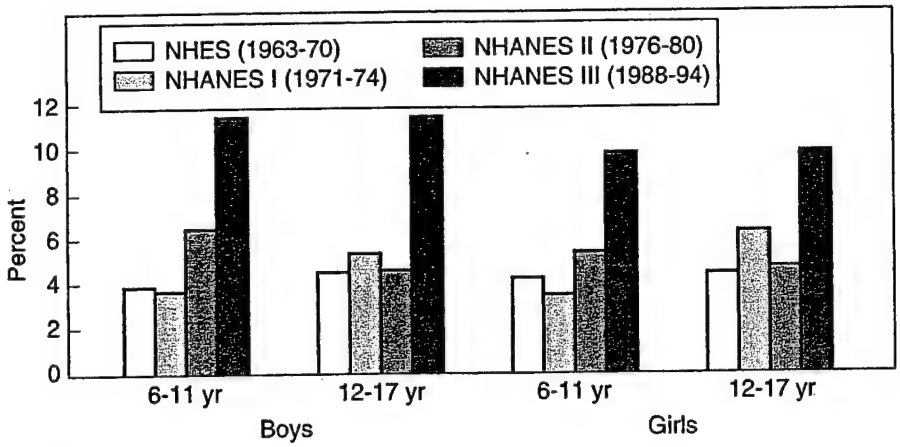

Figure 1.12 Trends in obesity among U.S. children.
From *Healthy People 2000*, Progress Review, CDC/NCHS 1999.

Decreases in physical activity may also account for some of the increase in overweight and obesity (Blair and Brodney 1999; Prentice and Jebb 1995). Participation in physical activity, either occupational or recreational, has not been tracked in a systematic way until recently (1985), when the National Health Interview Survey obtained baseline data for the *Healthy People 1990* survey. In that survey, roughly 24% of the population reported participating in no leisure time physical activity. Data collected from phase I (1988-1991) of the NHANES III confirmed that less than a quarter of the population engaged in no leisure time physical activity (Crespo et al. 1996). Other updates using NHANES III and other surveys confirmed that the percent of sedentary adults and children has either increased or not changed (Crespo et al. 1999; Kimm et al. 2002; Pate et al. 2002).

Summary

Obesity is highly prevalent and rising in the United States. Contributing factors may include reduction in all types of physical activities (e.g., leisure time, occupational, and transportation) and increases in caloric intake and smoking cessation, among others. The data presented in this chapter show that from 1976 to 1980 and 1988 to 1994, the percent increase in obesity was substantially greater than the increases observed from 1960 to 1976. These dramatic increases were observed in both adults and children. Racial and ethnic minorities, especially non-Hispanic blacks and Mexican Americans, also experienced obesity increases that were greater than those observed among non-Hispanic whites. More research is needed to understand the interaction among genetic, social, cultural, and environmental factors that may have influenced the dramatic increases in obesity in this nation.

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Appendix D

CV-Biosketch

Project title: Prostate Cancer Mortality in Puerto Rican Men: The Effect of Body Habitus and Physcial Activity

Award Number: DAMD 17-02-1-0252

Principal Investigator: Carlos J. Crespo, DrPH,MS, FACSM

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.
Follow the sample format on preceding page for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Carlos J. Crespo	Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Inter American University of Puerto Rico	B.S.	1980	Chemistry
Texas Tech University, Lubbock, Texas	M.S.	1986	Sports Health
Loma Linda University, Loma Linda, California	Dr.P.H.	1989	Preventive Care

A. Positions and Honors.

Positions and Employment

1980-1982 Respiratory Therapy Technician, Bella Vista Hospital, Mayaguez, Puerto Rico
1982-1984 Chemist, Spectron International, Inc., San Juan, Puerto Rico
1989-1991 Assistant Professor/Chair, Dept of Physical Education, Univ. Sagrado Corazon, San Juan, PR
1991-1995 Health Statistician, National Center for Health Statistics, CDC, Hyattsville, Maryland
1995-1996 Public Health Analyst, National Heart, Lung, and Blood Institute, NIH, Bethesda, Maryland
1993-1997 Adjunct Assistant Professor, Morgan State University, Baltimore, Maryland
1995-1997 Assistant Professor, Dept Health and Fitness, American University, Washington, DC
2000-present Associate Professor, Dept Social Preventive Medicine, University at Buffalo, Buffalo, NY
2001-present Adjunct Research Associate Professor, Roswell Park Cancer Institute, Buffalo, NY

Professional Activities

1988-present American College of Sports Medicine, (fellow), President, Regional Chapter (2000-02)
1992-present American Public Health Association, member
1999-present Montgomery County Latino Health Initiative, Maryland, Technical Advisor
2000-present American College of Epidemiology, member
2001-present American Council on Exercise, member Board of Directors
2001-present American Heart Association, Council on Epidemiology and Prevention, member
2001-present Minority Health Coalition of Buffalo, Board of Directors
2002-present Commission on Nutrition and Physical Activity, Commonwealth of Puerto Rico, member
2003-present New York State Physical Activity and Nutrition Steering Committee, member
2002-present NIH Epidemiology and Disease Control (EPIC) Study Section, member (2002-2004)

Honors

1995 Elected Fellow, American College of Sports Medicine, Indianapolis, IN
1997 Secretary's Award for Distinguished Service, U.S. Dept of Health and Human Services, Washington, DC
2003 Minority Health Scholar, National Center for Minority Health and Health Disparities, NIH, Bethesda MD

B. Selected peer-reviewed publications

1. **Crespo CJ**, Keteyian SJ, Heath GW, Sempos CT. Prevalence of leisure time physical activity among U.S. adults. Archives of Internal Medicine 1996;156:93-98.
2. **Crespo CJ**, Loria CM, Burt VL; Hypertension and other cardiovascular risk factors among Mexican Americans, Cuban Americans and mainland Puerto Ricans from the Hispanic Health and Nutrition Examination Survey. Public Health Reports. 1996;Vol III, Supplement 2:7-10.
3. Loria CM, **Crespo CJ**, Burt VL; Hypertension among Hispanic children, Public Health Reports, 1996;Volume III, Supplement 2:22-24.
4. Shankar S, Huerta EE, Gutierrez-Mohamed M, **Crespo CJ**; Cancer prevention behaviors and access to health care among Salvadorean living in Washington, D.C. Area. Ethn Disease, 1998 Winter;8(1):1-9.
5. Seagal D, **Crespo CJ**, Smit E. Active Seniors, Protect Them, Don't Neglect Them. Public Health Reports, March/April, 1998, Vol 113, 137-139.

6. Andersen RE, **Crespo CJ**, Bartlett SJ, Cheskin LJ, Pratt M. Vigorous physical activity & TV watching habits among US children & their relation to body weight and level of fatness. JAMA;1998;279:938-942.
7. **Crespo CJ**, Ainsworth B, Keteyian SJ, Heath GW, Smit E. Prevalence of no leisure-time physical activity and its relation to social class in US adults: Med Science Sports Exercise, 1999, 31:1821-1827.
8. **Crespo CJ,** Smit E, Andersen R, Carter-Pokras O, Ainsworth B. Race/ethnicity, social class and their relationship to physical inactivity during leisure-time in U.S. adults. Am J Prev Medicine, 2000,18:46-53.
9. **Crespo CJ,** Physical Inactivity in racial and ethnic minorities in the United States: The National Health Objectives. The Physician and Sports Medicine, 2000,28:36-51.
10. Snelling AS, **Crespo CJ**, Schaeffer M, Walburn L, Smith S. Non-modifiable and modifiable factors correlated to osteoporosis in post-menopausal women. Journal of Women's Health. 2001;10:57-65.
11. **Crespo CJ**, Smit E, Andersen RE, Troiano RT, Bartlett S, Macera C. Television Watching, Energy Intake, and Severe Overweight in US children. Results from the Third National Health and Nutrition Examination Survey. Archives of Pediatric and Adolescent Medicine, 2001;155:360-365.
12. Andersen RE, **Crespo CJ,** Franckowiak S, Christmas C, Walston J. Obesity and reports of no-leisure time physical activity among older Americans. Educational Gerontology. 2001;27:297-306.
13. **Crespo CJ**, Smit E. Acculturation and physical inactivity during leisure-time among Mexican Americans. American Journal of Public Health, 2001:91(8)1254-1257.
14. Bassett DR, Fitzhugh G, **Crespo CJ**, King GA, McLaughlin JE, Nelson D. Physical activity and ethnic differences in hypertension prevalence in the United States. Preventive Medicine, 2002;34:179-86.
15. Friedman D, **Crespo CJ**, Bellantoni M, Andersen RE. Race/ethnicity, social class, and their relationship to hormone replacement therapy. Menopause. 2002 Jul-Aug;9(4):264-72.
16. **Crespo CJ**, Smit E, Snelling AS, Sempos CT, Andersen RE. Hormone replacement therapy and its relationship to lipid and glucose metabolism in diabetic and nondiabetic postmenopausal women: results from the third national health and nutrition examination survey. Diabetes Care. 2002;10:1675-80.
17. Nolte, R, Franckowiak S, **Crespo CJ**, Andersen RE. U.S. Military Weight Standards: What Percent of U.S. Young Adults Make the Grade? American Journal of Medicine. 2002;13(6):486-490.
18. **Crespo CJ**, Garcia-Palmieri M, Sorlie P, Perez-Perdomo Rosa, McGee DL, Smit E, Sempos C, Lee IM. The relationship between physical inactivity, body weight, and all cause mortality in Puerto Rican men: Results from the Puerto Rico Heart Health Program. Annals of Epidemiology. 2002;12:543-552.
19. Sempos CT, Rehm J, Wu T, **Crespo CJ**, Trevisan M. Average volume of drinking and all-cause mortality in African Americans. The NHEFS cohort. Alcohol: Clinical and Experimental Research. Jan, 2003;27.
20. Andersen RE, **Crespo CJ**, Bartlett SJ, Bathon JM, Fontaine KR. Relationship between body weight gain and significant knee, hip, and back pain in older Americans. Obes Res. 2003 Oct;11(10):1159-62
21. **Crespo CJ,** Arbesman J. Obesity in the United States: A worrisome epidemic. The Physician and Sports Medicine. 2003; 31(11):23-28.
22. Garcia-Palmieri MR, **Crespo CJ**, McGee DL, Smit E, Sempos CT, and Sorlie PD. Wide pulse pressure as a risk factor for cardiovascular mortality in Puerto Rican men. Nutrition Cardiovascular Disease. In press

Contributions to government reports:

1. ***Surgeon General Report on Physical Activity and Health***; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, July 1996.
2. ***Sixth Report of the Joint National Committee on Detection, Evaluation, and Control of High Blood Pressure***. National High Blood Pressure Education Program. November, 1997.
3. ***Salud para su Corazon: Bringing Heart Health to Latinos***. A guide for building community programs. Office of Prevention, Education and Control, National Heart, Lung, and Blood Institute, December, 1998.

Book Chapter(s):

1. **Crespo CJ**. Exercise in the prevention of chronic disabling diseases. In "Exercise in Rehabilitation Medicine," edited by Frontera WR, et al., Human Kinetics Publishers; Urbana, IL May 1999.
2. **Crespo CJ,** Smit E, Garcia-Palmieri MR. Hypertension among Hispanics. In: Hypertension Premier. Edited by Izzo JL and Black HR, Lippincott Williams Wilkins, Philadelphia, Pennsylvania. April, 2003.
3. **Crespo CJ**, Smit E. Prevalence of Overweight and Obesity. In "Obesity: Etiology, Assessment, Treatment, and Prevention" edited by Andersen RE, Human Kinetics Publishers; Urbana, IL. May, 2003.

C. Research Support

Ongoing Research Support

R01 ES11368 Crespo (PI) 09/01/01-8/31/06
NIEHS
Community Based Research of Autoimmune Disease and Asthma
This project proposes to continue community participatory research projects currently underway in two targeted minority communities in Buffalo: 1) a community on Buffalo's east side concerned with pollution from toxic waste sites and point sources of pollution and a cluster of autoimmune disease, and 2) a west-side community of Buffalo near a high-traffic corridor with elevated exposures to diesel exhaust and documented higher prevalence of asthma.
Role: PI

DAMD17-02-1-0252 Crespo (PI) 02/01/02-01/31/05
USAMRDC
Prostate Cancer Mortality in Puerto Rican Men: The Effect of Body Habitus and Physical Activity
This proposal will study prospectively the effect of excess body weight, body fat and physical inactivity on prostate cancer mortality in Puerto Rican Men from the Puerto Rico Heart Health Program Study.
Role: PI

1 R03 CA103475-01 Crespo (PI) 09/01/03-08/30/05
NIH/NCI
Diet and Cancer in Puerto Rican Men
This proposal will study the unique pattern of the Puerto Rican diet in relation to prostate cancer in Puerto Rican men.
Role: PI

1 P20 CA96256-01A1 Crespo (PI) 09/01/03-08/31/06
NCI/NIH
University of Puerto Rico-Roswell Park Cancer Partnership
This is a planning grant to establish collaborative work of inter-disciplinary researchers from the University of Puerto Rico and Roswell Park Cancer Institute.
Role: PI

DHHS-HRSA Amber Slichta (Executive Director) Crespo (PI) 09/01/03-08/31/04
Sub-award, Health for All of Western New York, Inc.
The Western New York Health Risk Appraisal is a community health assessment survey of the 8 counties of Western New York. The Department of Social and Preventive Medicine will provide technical assistance in the design, planning and implementation of the survey, statistical analysis, report of findings and feedback to Health for All of Western New York, Inc.
Role: PI

Completed Research Support

NIH Crespo (PI) 09/01/99-08/30/00
Puerto Rico Cancer Mortality Feasibility Study
Objective: To assess the feasibility of obtaining cancer mortality using the Puerto Rico Demographic Registry, Puerto Rico Cancer Registry, and the US National Death Index in men from the Puerto Rico Heart Health Program.
Role: PI

Completed Research Support (continued)

5 T32 CA 09051-21A1 Vena (PI) 09/29/97-07/31/03
NIH/NCI
Medical Sociology, Epidemiology, and Control of Cancer
Objective: This is a training grant for pre-doctoral and postdoctoral fellows in cancer epidemiology.
Role: Steering committee member